

WHAT IS CLAIMED IS:

1. A quadrature modulation apparatus comprising:  
local signal generating means for generating two  
local signals each having a fundamental wave of a  
5 predetermined frequency and having a 90° phase  
difference therebetween;

two low-pass filters for suppressing high-  
frequency band components of the two local signals  
generated from said local signal generating means, each  
10 of the high-frequency band components containing the  
fundamental wave; and

modulation means for subjecting two-channel base-  
band signals to quadrature modulation by use of the two  
local signals respectively output from said two low-  
15 pass filters.

2. A radio transmission apparatus comprising:  
local signal generating means for generating two  
local signals each having a fundamental wave of a  
predetermined frequency and having a 90° phase  
20 difference therebetween;

two low-pass filters for suppressing high-  
frequency band components of the two local signals  
generated from said local signal generating means, each  
of the high-frequency band components containing the  
25 fundamental wave;

modulation means for subjecting two-channel base-  
band signals to quadrature modulation by use of the two

local signals respectively output from said two low-pass filters; and

radio transmission means for radio-transmitting a modulation signal obtained by said modulation means.

5           3. The radio transmission apparatus according to claim 2, wherein said radio transmission means is of a modulation loop system which includes a non-linear amplifier for amplifying the modulation signal, generates a transmission signal having the same phase  
10 deviation as a modulation signal obtained after amplification by the non-linear amplifier and transmits the transmission signal by radio.

          4. The radio transmission apparatus according to claim 3, wherein said radio transmission means  
15 selectively sets a frequency band of the transmission signal to one of a plurality of predetermined frequency bands.

          5. The radio transmission apparatus according to claim 2, wherein said radio transmission means is of an  
20 up-conversion system which includes an up-converter for generating a transmission signal whose frequency band is converted to a predetermined frequency band by synthesizing the modulation signal with a predetermined local signal and transmits the transmission signal  
25 obtained by said up-converter by radio.

          6. The radio transmission apparatus according to claim 5, wherein said radio transmission means

selectively sets a frequency band of the transmission signal to one of a plurality of predetermined frequency bands.

5        7. The radio transmission apparatus according to claim 2, wherein said radio transmission means is of a direct conversion system for radio-transmitting the modulation signal as it is as a transmission signal.

10       8. The radio transmission apparatus according to claim 7, wherein said radio transmission means selectively sets a frequency band of the transmission signal to one of a plurality of predetermined frequency bands.

15       9. The radio transmission apparatus according to claim 2, wherein said radio transmission means includes first transmission means of a modulation loop system which includes a non-linear amplifier for amplifying the modulation signal, generates a transmission signal having the same phase deviation as a modulation signal obtained after amplification by the non-linear  
20       amplifier and transmits the transmission signal by radio; second transmission means of an up-conversion system which includes an up-converter for generating a transmission signal whose frequency band is converted to a predetermined frequency band by synthesizing the  
25       modulation signal with a predetermined local signal and transmits the transmission signal obtained by said frequency converting means by radio; and selection

means for selectively operating one of said first and second transmission means.

10. The radio transmission apparatus according to claim 2, wherein said radio transmission means includes  
5 first transmission means of a modulation loop system which includes a non-linear amplifier for amplifying the modulation signal, generates a transmission signal having the same phase deviation as a modulation signal obtained after amplification by the non-linear  
10 amplifier and transmits the transmission signal by radio; second transmission means of a direct conversion system for radio-transmitting the modulation signal as it is as a transmission signal; and selection means for selectively operating one of said first and second  
15 transmission means.

11. The radio transmission apparatus according to claim 2, wherein said radio transmission means includes first transmission means of an up-conversion system which includes an up-converter for generating a  
20 transmission signal whose frequency band is converted to a predetermined frequency band by synthesizing the modulation signal with a predetermined local signal and transmits the transmission signal obtained by said frequency converting means by radio; second  
25 transmission means of a direct conversion system for radio-transmitting the modulation signal as it is as a transmission signal; and selection means for

selectively operating one of said first and second transmission means.

12. A quadrature modulation apparatus comprising:

5 local signal generator which generates two local signals each having a fundamental wave of a predetermined frequency and having a  $90^\circ$  phase difference therebetween;

10 two low-pass filters which suppresses high-frequency band components of the two local signals generated from said local signal generator, each of the high-frequency band components containing the fundamental wave; and

15 modulator which inputs the two local signals respectively outputs from said two low-pass filters and which outputs two-channel quadrature modulated base-band signals.

13. A radio transmission apparatus comprising:

20 local signal generator which generates two local signals each having a fundamental wave of a predetermined frequency and having a  $90^\circ$  phase difference therebetween;

25 two low-pass filters which suppresses high-frequency band components of the two local signals generated from said local signal generator, each of the high-frequency band components containing the fundamental wave;

modulator which inputs the two local signals

respectively outputs from said two low-pass filters which outputs two-channel quadrature modulated base-band signals; and

transmitter which transmits the modulated signal.

5           14. The radio transmission apparatus according to claim 13, wherein said transmitter is of a modulation loop which includes a non-linear amplifier which amplifies the modulation signal, generates a  
10           transmission signal having the same phase deviation as a modulation signal obtained after amplification by the non-linear amplifier and transmits the transmission signal.

15           15. The radio transmission apparatus according to claim 14, wherein said transmitter selectively sets a frequency band of the transmission signal to one of a plurality of predetermined frequency bands.

20           16. The radio transmission apparatus according to claim 13, wherein said transmitter is of an up-conversion system which includes an up-converter which generates a transmission signal whose frequency band is converted to a predetermined frequency band by synthesizing the modulation signal with a predetermined local signal and transmits the transmission signal obtained by said up-converter.

25           17. The radio transmission apparatus according to claim 16, wherein said transmitter which selectively sets a frequency band of the transmission signal to one

of a plurality of predetermined frequency bands.

18. The radio transmission apparatus according to claim 13, wherein said transmitter is of a direct conversion system for radio-transmitting the modulation  
5 signal as it is as a transmission signal.

19. The radio transmission apparatus according to claim 18, wherein said transmitter which selectively sets a frequency band of the transmission signal to one of a plurality of predetermined frequency bands.

20. The radio transmission apparatus according to claim 13, wherein said transmitter which includes first transmitter of a modulation loop system which includes a non-linear amplifier which amplifies the modulation signal, generates a transmission signal having the same  
10 phase deviation as a modulation signal obtained after amplification by the non-linear amplifier and transmits the transmission signal; second transmitter of an up-conversion system which includes an up-converter which generates a transmission signal whose frequency band is  
15 converted to a predetermined frequency band by synthesizing the modulation signal with a predetermined local signal and transmits the transmission signal obtained by said frequency converter; and selector which selects one of said first and second transmitter.

21. The radio transmission apparatus according to claim 13, wherein said transmitter includes first transmitter of a modulation loop system which includes  
25

a non-linear amplifier which amplifies the modulation signal, generates a transmission signal having the same phase deviation as a modulation signal obtained after amplification by the non-linear amplifier and transmits the transmission signal; second transmitter of a direct conversion system which transmits the modulation signal as it is as a transmission signal; and selector which selects one of said first and second transmitter.

22. The radio transmission apparatus according to claim 13, wherein said transmitter includes first transmitter of an up-conversion system which includes an up-converter which generates a transmission signal whose frequency band is converted to a predetermined frequency band by synthesizing the modulation signal with a predetermined local signal and transmits the transmission signal obtained by said frequency converter; second transmitter of a direct conversion system which transmits the modulation signal as it is as a transmission signal; and selector which selects one of said first and second transmitter.

23. A quadrature modulation method comprising the steps of:

generating two local signals each having a fundamental wave of a predetermined frequency and having a  $90^\circ$  phase difference therebetween;

suppressing high-frequency band components of the two local signals, each of the high-frequency band



components containing the fundamental wave; and

subjecting two-channel base-band signals to quadrature modulation by use of with the two local signals whose high-frequency band components are suppressed.

5

24. A quadrature modulation method comprising the steps of:

generating two local signals each having a fundamental wave of a predetermined frequency and having a 90° phase difference therebetween;

10

suppressing high-frequency band components of the two local signals, each of the high-frequency band components containing the fundamental wave; and

quadrature modulating two-channel base-band signals with the two local signals whose high-frequency band components are suppressed.

15